4.0 ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

The Joint-Lead Agencies have utilized a scientific and analytic evaluation with which to compare the No Action and the Proposed Action Alternatives. This chapter of the EA evaluates direct, indirect, and cumulative impacts for all resources described in Chapter 3, Affected Environment. Environmental commitments, which will provide ongoing guidance for the proposed project, are summarized.

4.2 GEOMORPHOLOGY AND SOILS

Under the No Action Alternative, should the drought continue, the geomorphology of the Rio Grande channel would either remain stable or continue to narrow and deepen into a single thalweg. In the absence of frequent high discharges, the river in this reach will continue to have high velocities and limited meandering between islands and bars. Islands and bars will become increasingly stable with increasingly mature vegetation, predominantly non-native species. The channel is expected to degrade, resulting in high banks that are rarely inundated under the No Action Alternative. Based on RGSM monitoring, the geomorphic trends produced under No Action are unfavorable for the species and do not promote egg retention or larval success.

Under the Proposed Action, the Project would undertake actions to alter the islands and bars within the channel as well as parts of the channel banks to create the desired habitat types. In doing so, the current geomorphology is anticipated to change slightly. Under the Proposed Action there would be minimal to moderate soil disturbance levels. The overall effects will be monitored and quantified, but are expected to be beneficial and completely within normal parameters for a sand-bed river system.

Before the initiation of construction activities, environmental protection measures would be reviewed at a pre-project meeting. All activities would be in compliance with local, state, and federal regulations. To mitigate negative effects from erosion, native herbaceous communities would be planted.

4.3 HYDROLOGY AND HYDRAULICS

Under both the No Action and the Proposed Action there would be no change in the amount or duration of flow in the river. The Proposed Action would work with the existing hydrologic conditions to develop the desired habitat types.

4.4 WATER QUALITY

The No Action Alternative will result in continued water quality that meets applicable standards for most physical constituents, such as surface water temperature, pH, turbidity, dissolved

oxygen (DO), suspended sediments (SSED), conductivity/total dissolved solids (TDS), and fecal coliform.

Under the Proposed Action, no adverse impact to surface or ground water quality is anticipated. The Clean Water Act (CWA) provides protection for wetlands and waters of the United States from impacts associated with dredged or fill material in aquatic habitats, as defined under Section 404(b)(1). CWA compliance is required of all aspects of the Project, and since most work associated with the Proposed Action would be completed within jurisdictional areas, a 404 permit is required. Compliance with the CWA would ensure that the Proposed Action would have no adverse effect on the water quality of the MRG. Water quality would be monitored and evaluated for the duration of the project.

The Proposed Action would result in temporary changes in the measures for physical constituents, particularly for turbidity and total dissolved solids, because of the movement and dispersal of sediments within the river channel. Short-term and localized adverse effects to water quality may result, but are not expected to exceed applicable standards. The techniques to be tested will depend on high-flow events to release and redistribute sediments within the floodplain. The high-volume flows would be expected to dilute the effects of added sediment load on water quality standards.

4.5 CULTURAL RESOURCES AND TRADITIONAL CULTURAL PROPERTIES

Under the No Action there would be no change to cultural resources and traditional cultural properties.

No known archaeological resources were found inside the levees where the Proposed Action would take place. Should archeological resources be found during construction at staging areas, access locations, or proposed construction sites, work in that area would stop and the proper authorities informed. Because the Project area is contained completely within the active floodplain of the Rio Grande, no cultural resources survey is proposed as part of the Proposed Action. Project activities would be restricted to islands within the channel of the Rio Grande and to the banks of the river. Access to the channel would be wherever possible, but most likely along existing access routes. Therefore, no adverse impacts would occur to known archaeological resources from the Proposed Action.

Tribal Consultation has taken place to determine whether any TCPs occur within or near the proposed action areas. No TCPs were identified with the potential for adverse impacts.

4.6 VEGETATION AND WETLAND RESOURCES

Increased over-island flooding and some overbank flooding are anticipated under the Proposed Action, compared to the No Action Alternative. Riparian vegetation is, by definition, subject to intermediate levels of disturbance from flooding. Reduced levels of annual maximum flows under the No Action Alternative have reduced these natural processes. Under the Proposed Action, some native and non-native vegetation would be disturbed by mechanical means during

the implementation of the restoration techniques. The estimated acreage of impacts to riparian vegetation during implementation of Phase I is shown in Table 4.1. Additional detail regarding impacts to vegetation for the North Diversion Channel and South Diversion Channel subreaches is available in Appendix A.

Table 4.1. Effects of Proposed Restoration Techniques on Vegetation

Restoration Technique	Phase I Treated Acres)	Maximum Number of Acres Treated	Relative Cover of Affected Vegetation *		
			Herbaceous/ Grasses	1-5m Woody Vegetation (Native)	5-15m Woody Vegetation (Mixed Native & Non-Native)
Vegetated Island Evaluation	19	250	5.5%	44%	50.5%
Bar Habitat Modification	12	64	15%	<5%	<5%
Large Woody Debris	None	None	None	None	None
Bank Scouring and Scalloping	3.5	6	20%	<10%	20%
Ephemeral Channels	2	20	75%	<10%	<10%

*Any impacts to dense woody vegetation more than three meters in height will be avoided wherever possible during construction.

Each technique has somewhat different levels of potential impact on riparian vegetation. All vegetative communities, native and non-native, would be altered on selected vegetated islands under the Proposed Action. Dead and downed native deciduous species may be used for in-channel placement as large woody debris. Living native deciduous species would be avoided. Some herbaceous floodplain species may be trampled during construction, but impacts would be moderate.

The Rio Grande, including the proposed project locations, is a USACE jurisdictional waterway. Executive Order 11990 (Protection of Wetlands; FR 1977a) requires the avoidance of short- and long-term adverse impacts associated with the destruction, modification, or other disturbance of wetland habitats. Compliance with Section 404 of the CWA will prevent net loss of wetlands because of Project actions. As a result, the Proposed Action would not impact wetland communities in the project area. Executive Order 11988 (Floodplain Management; FR 1977b) provides federal guidance for activities within the floodplains of inland and coastal waters and requires federal agencies to "ensure that its planning programs and budget requests reflect consideration of flood hazards and floodplain management." Proposed modification to riverbanks and islands will not result in significant changes in flooding patterns outside the existing floodplain.

4.7 FISH AND WILDLIFE

Short-term impacts to fish and wildlife resources would not occur under the No Action Alternative. Long-term adverse effects on breeding and foraging fish, avian species, and mammals, however, are gradual and difficult to quantify. They result from long-term reduction in riparian ecological processes, encroachment of non-native species, increased fire hazard, and increased depth to groundwater.

By comparison, the Proposed Action would produce short-term direct impacts on wildlife in the immediate area of disturbance, and long-term beneficial effects on fish and riparian wildlife from improved ecological function and aquatic habitat. To avoid direct impact to migratory birds protected by the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703, ET seq.), clearing and grubbing of woody vegetation would be scheduled between August 15 and April 15, outside of the normal breeding season for many avian species. Should vegetation removal and construction take place between April 15 and August 15, preconstruction nesting bird surveys should be conducted to identify potential MBTA issues. Any positive preconstruction survey results or observations should be brought to the attention of U.S. Fish and Wildlife Service in order to determine methods of MBTA impact avoidance.

Other wildlife species inhabiting vegetated islands, such as reptiles, mammals, and amphibians, would be temporarily displaced and may experience mortality during the implementation of the Proposed Action. These short-term effects would be outweighed by the long-term benefits of a healthier riparian ecosystem. No adverse impacts on fish species are expected to occur under the Proposed Action. Long-term benefits from aquatic habitat creation and increased food abundance within mesohabitats are expected.

4.8 THREATENED, ENDANGERED, AND SPECIAL STATUS SPECIES

Rio Grande Silvery Minnow *(Hybognathus amarus)*

The No Action Alternative will continue the trends of population decline for the species in the Albuquerque Reach. The channel in the Albuquerque Reach is incised and degradation is expected to continue (Porter and Massong 2004). RGSM occurs in the project area, and fish obtained from recent salvage operations conducted during river intermittency have been stocked in the Albuquerque Reach (M. Hatch, personal communication 2004). Releases of rescued RGSM have been made near Alameda Bridge, which is in the project area. In-channel efforts will take place upstream of the release location. Increasing the amount and/or quality of suitable riverine habitat is essential for successful application of supplemental augmentation and rescue efforts for effective RGSM population management.

The Proposed Action may affect but is not likely to adversely affect designated RGSM critical habitat. The primary objective of the Proposed Action is to create mesohabitat for the RGSM. The Proposed Action may provide beneficial effects to RGSM and their critical habitat, including improved egg and larval retention in the Albuquerque Reach, increased recruitment rates and survival of young of year and adult RGSM.

RGSM critical habitat encompasses the entire project area (FR 2003b). Short-term effects to RGSM critical habitat may occur following habitat restoration activities, as discussed in the Biological Assessment. Work would take place in the river channel. Best Management Practices would be enforced to minimize erosion and sediment inputs into the river during construction.

The Proposed Action would have long-term beneficial effects on both RGSM critical habitat and on the distribution and abundance of the species. Releases of rescued RGSM have been made near Alameda Bridge, which is in the project area and the catch rates for RGSM increased in the project area in 2005. In-channel efforts would take place upstream of the release location. Increasing the amount and/or quality of suitable riverine habitat is essential for successful application of supplemental augmentation and rescue efforts for effective RGSM population management. The primary objective of the Proposed Action is to create mesohabitat for the RGSM. The Proposed Action may provide beneficial effects to RGSM and their critical habitat, including improved egg and larval retention in the Albuquerque Reach, increased recruitment rates and survival of young of year and adult RGSM.

The short-term construction effects of the Proposed Action may adversely affect RGSM and lead to harassment or take resulting from equipment working and depositing sediments in shallow water. The Fish and Wildlife Service has issued a biological opinion on the effects of the Project on RGSM and Southwestern willow flycatcher that determines that short-term direct effects are likely to occur from operation of heavy equipment in the channel where the fish is known to occur, but these effects are minimal and are not likely to jeopardize the continued existence of RGSM (USFWS November 3, 2005). The Service has issued a Biological Opinion and an Incidental Take Statement for the Proposed Project, pursuant to sections 7(a)(2) and 7(b)(4) of the Endangered Species Act. In the Incidental Take Statement, the Service estimates that 190 RGSM may be taken during island modification and scouring and scalloping of the riverbanks and pointbars, and placement of sediments and woody debris adjacent to the islands. The Service has determined that this level of take is not likely to result in jeopardy to the RGSM if specified Reasonable and Prudent Measures and terms and conditions are met to minimize impacts due to habitat restoration activities.

The biological opinion specifies the following Reasonable and Prudent Measures (RPMs):

1. Minimize take of RGSM due to habitat restoration activities.
2. Manage for the protection of water quality from activities associated with the restoration project.
3. Continue to work collaboratively with the Service on the Middle Rio Grande Endangered Species Act Collaborative Program.

To implement these RPMs, the biological opinion further specifies that ISC will:

- Monitor presence/absence of RGSM at construction sites, and use adaptive management to modify island restoration, souring and scalloping, and creation of ephemeral channels, as appropriate.
- Report to the Service the Restoration Monitoring Plan.
- Report findings of injured or dead RGSM to the Service.
- Report to the Service water quality measurements taken before, during, and after construction activity.

- Report to the Service any significant spills of hydraulic fluids, fuels, and other hazardous materials.
- Work to conduct further habitat/ecosystem restoration projects in the Middle Rio Grande to benefit RGSM.

Yellow-billed Cuckoo (Coccyzus americanus occidentalis)
The No Action Alternative will not make changes to the riparian habitats utilized by this species and no effects will occur.

The Proposed Action may affect but is not likely to adversely affect the yellow-billed cuckoo. To minimize impact on this and other riparian species, clearing and grubbing of woody vegetation would be scheduled between September and April. Should vegetation removal and construction be implemented during the breeding season (April-August), pre-construction breeding bird surveys would be conducted and monitoring performed to assure avoidance of impacts. Any positive preconstruction survey results or observation of affected species during construction would be coordinated with USFWS to discuss nesting area avoidance.

Southwestern Willow Flycatcher (*Empidonax traillii extimus*)
A vegetation survey was conducted to evaluate the potential suitability of habitats for flycatchers in the Project Area. Vegetation of suitable height and density to support flycatcher breeding was not found in any areas to be impacted by the project. Without existing suitable habitat or records of breeding, the No Action Alternative would have no effect on the species.

The Proposed Action would disturb or remove riparian vegetation temporarily which might support migrating flycatchers in the Project Area. Since the proposed construction would take place outside of the breeding season for southwestern willow flycatcher, no adverse effects to the species are anticipated. The Proposed Action may affect but is not likely to adversely affect southwestern willow flycatcher breeding habitat. To minimize impact on this and other riparian species, clearing and grubbing of woody vegetation would be scheduled between September and April. Should vegetation removal and construction be implemented during the breeding season (April-August), pre-construction breeding bird surveys would be conducted and monitoring performed to assure avoidance of impacts. Any positive preconstruction survey results or observation of affected species during construction would be coordinated with USFWS to discuss nesting area avoidance.

Bald Eagle (*Haliaeetus leucocephalus*)
The No Action Alternative would not disturb the riparian vegetation where this species may occur, therefore this alternative would have no effect on the species.

The Proposed Action may have short-term potential effects to bald eagles during construction, related to temporary noise and other disruptions. Removal of woody vegetation and other construction activities may take place during the winter months when bald eagles may be in the proposed project area. Guidelines would be employed to minimize the potential for disturbing bald eagles. If a bald eagle is visible within 0.25 mile of the proposed project area in the morning when activity starts, or arrives during breaks in activity, the contractor would be required to suspend all construction activity until the bird leaves on its own volition, or the project biologist,

in consultation with the Fish and Wildlife Service (USFWS), determines that the potential for harassment is minimal. However, if a bald eagle arrives during construction activities, or is observed 0.25 mile or more from the construction site, activity would not be interrupted. The Proposed Action may affect but is not likely to adversely affect the bald eagle.

Common Black-hawk *(Buteogallus anthracinus)*
The No Action Alternative would not make any changes to riparian vegetation used by this species, therefore no adverse impacts to this species and its habitats would occur.

The Proposed Action would include clearing of woody vegetation but not mature gallery trees. In addition, areas proposed for vegetation clearing and disturbance are not vegetated with mature forest habitats. Therefore, the Proposed Action should have no adverse impact on the common black-hawk. As a precautionary measure, the contractor or project biologist will follow the same protocol as that applied to bald eagles during construction activities.

New Mexican Jumping Mouse (*Zapus hudsonius luteus*)
Lack of suitable habitat in the project areas makes it unlikely that either the No Action Alternative or the Proposed Action would have an adverse effect on the New Mexican Jumping Mouse.

4.9 SOCIOECONOMICS

The long-term economic consequences of No Action are unknown at this time and difficult to assess. These impacts may be greater than the Proposed Action due to the significant costs of other RGSM habitat restoration options that have been proposed by the Middle Rio Grande Collaborative Program.

The Proposed Action would not adversely affect current economic and socioeconomic conditions within Bernalillo and Sandoval Counties. The cost of the Proposed Action would range from $1,500,000 to $2,500,000, depending on the funding available during 2005-2009. This amount is low in comparison with combined state and federal expenditures within Bernalillo and Sandoval Counties and will not adversely affect current economic conditions.

Both the No Action and the Proposed Action would see temporary increases in federal and state spending in Bernalillo and Sandoval Counties to provide habitat restoration for the RGSM. Regardless of this Proposed Action, the Biological Opinion of 2003 requires that aggressive measures be taken to improve and restore aquatic habitat for the RGSM, and that those measures should be conducted in all areas of critical habitat. The signatories to the MRG ESA Collaborative Program have identified the Albuquerque Reach as an area of high priority, since water quantity is more reliable than that in more southern reaches and the area is upstream of Elephant Butte Reservoir, and therefore able to support the duration of downstream egg drift required for successful breeding.

4.10 VISUAL AND AESTHETIC RESOURCES

The No Action Alternative will continue to provide long-term aesthetic value to RGVSP visitors and unimpeded vistas of the Rio Grande and the riparian forest from bridges. There would be no short-term changes in the visual and aesthetic experience. Long-term impacts to the river and bosque from changes in the channel configuration would be so slow as to be imperceptible to the public.

The Proposed Action would not produce any long-term changes in the visual and aesthetic experience of the public, either from the bridges, the trails, riverside areas, or adjacent homes. The Project would imitate natural processes of shifting channel configuration, islands, and bars and vegetation mosaic that is part of the aesthetic experience of a river.

The Project would create temporary channel and/or bank modifications that may be visible by pedestrians using the bridges, the trails, and river edge, or adjacent homeowners in the immediate time and place of construction. The short-term effects of equipment operation would disturb the aesthetic experience of individuals within the RGVSP within hearing distance of the construction. Of the bridge crossings, the proposed construction areas may be visible from bridge crossings at Alameda, Rio Bravo, and Interstate 40 bridges. The Alameda Bridge crossing has a pedestrian bridge as well as a bridge for motorized vehicles. The Interstate 40 crossing has a number of adjacent homeowners within continuous view of the project. The visual and aesthetic impacts of the proposed Project would therefore be brief and limited to relatively few pedestrians using the trails near the project, but the intensity of this short-term impact may be experienced as high to those who regularly use these trails for their natural aesthetic value.

4.11 AIR QUALITY AND NOISE

The project area is a natural area and a park with nature trails and other recreational uses in which a quiet atmosphere is expected. The No Action Alternative would hold ambient noise levels to this level.

The Proposed Action is not anticipated to generate ambient noise that exceeds the City of Albuquerque Noise Ordinance. Construction equipment to be used during the Proposed Action would create temporary variable noise levels that would likely exceed allowable ambient noise of 80 dBa in the immediate vicinity of the restoration site. All construction sites are anticipated to be greater than 500 feet from any sensitive noise receptors. The nearest noise receptors would include the recreating public on nearby trails and residents of nearby homes outside the levees. Under the Proposed Action, noise impacts during heavy equipment use would be short term and occur during normal business hours to minimize noise disturbance. The riparian vegetation and levee would abate some of the noise generated by the equipment. A Construction Noise Permit may be issued from the City of Albuquerque if sensitive noise receptors are identified within 500 feet of restoration construction sites.

Construction equipment would temporarily generate fumes and air emissions under the Proposed Action. The level of air emissions is anticipated to be low and in compliance with local and federal air emission standards.

4.12 NET WATER DEPLETIONS

The No Action Alternative would continue current levels of water depletions in the Albuquerque Reach, as identified in previous studies (SSPA 2004). The goal of the Proposed Action is to neither increase nor decrease depletions. The majority of the proposed work will occur on islands and bars that are temporary in nature and located within the 660 foot wide river channel, where the river water-level elevation and river surface open area fluctuate significantly. Therefore, the work would not increase depletions to any measurable or calculable degree. Actions on the river channel banks that could potentially increase depletions, such as increasing surface water open areas, will be avoided. If necessary, a mulch (gravel mulch, tree mulch, etc., as appropriate) will be placed in areas where the riverbank height is lowered or ephemeral channels are constructed to offset any increase in water losses from those actions. Evaluation of the net depletion effects of each proposed technique will be performed over the course of the Project. Restoration techniques that are determined to add significant levels of depletion to the surface waters of the Rio Grande would be curtailed unless offset with other sources of water.

4.13 ENVIRONMENTAL JUSTICE

The Proposed Action is in compliance with Executive Order 12898 (FR 1994b), Environmental Justice in Minority and Low-Income Populations. The proposed project is located on the active flood plain of the Rio Grande, between the flood control levees and within the Albuquerque reach of the river. Outside of the levees, nearby land use along this reach of the river includes residential neighborhoods of all economic strata, agricultural land, and commercial and industrial uses.

Regardless of the level of impacts, they will be similar throughout the Albuquerque reach of the river and will affect a diverse group of communities and populations. There will be no disproportional high or adverse human health or environmental effects on minority or low-income populations.

4.14 INDIAN TRUST ASSETS

Consultation has taken place to identify any Indian Trust Assets (ITAs) in the project areas and to assess potential impacts, in accordance with Secretarial Order 3175 and Reclamation ITA policy. No ITAs were identified.

4.15 IRRETRIEVABLE COMMITMENT OF RESOURCES

The Proposed Project would result in the unavoidable harm or harassment of approximately 190 endangered RGSM, according to the biological opinion of the effects of the Middle Rio Grande Riverine Habitat Restoration Project. While this represents a loss to the species, the Service does not anticipate that this will jeopardize the species' continued existence (USFWS, November 3, 2005). Implementation of the Project would also result in the commitment of resources such as fossil fuels, construction materials, and labor. In addition, State and Federal public funds would be expended for the construction of the proposed project.

4.16 CUMULATIVE IMPACTS

The National Environmental Policy Act (NEPA) defines cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (42 U.S.C. 4331-4335). Cumulative environmental impacts associated with the Rio Grande, including islands and riparian areas, have been evaluated for the following projects relative to the Proposed Action.

Middle Rio Grande Endangered Species Act Collaborative Program

The Middle Rio Grande Endangered Species Act Collaborative Program has solicited and funded multiple habitat restoration projects, including the City of Albuquerque and USACE restoration projects nearby the Proposed Action. (Reclamation 2002). RGSM augmentation funded by the Collaborative Program should provide positive synergistic interactions with habitat that would be created by this project.

Upper Rio Grande Water Operations Environmental Impact Statement

Currently, the USACE, the ISC, and Reclamation are signatories of a MOA to develop integrated water operations rules for several dams on the Rio Grande upstream of the project area (URGWOPS 1999).

City of Albuquerque San Juan–Chama Drinking Water Project

The City of Albuquerque will begin construction of a diversion dam in the Rio Grande south of Alameda Bridge to divert San Juan–Chama water for the City's drinking water supply. The City is currently constructing water intakes and a crossing of the Rio Grande at Campbell Road for the same project. Several proposed habitat restoration projects are specified for the Albuquerque Reach as mitigation for adverse effects from this project (Reclamation 2004).

Middle Rio Grande Bosque Wildfire Project and Wetland Restoration Project

The USACE is involved in a Bosque Wildfire Project throughout the Albuquerque Reach of the Rio Grande, thinning riparian vegetation at selected locations adjacent to the river. The USACE is also involved in Ecosystem Restoration projects at the Albuquerque Biologic Park and the Wetland Restoration Project south of Central Avenue (USACE 2000).

New Mexico State RGSM Habitat Restoration Projects

Currently, the New Mexico Water Trust Board and the ISC are conducting projects to improve RGSM habitat. These projects include increasing scientific knowledge of available food for aquatic species within the Middle Rio Grande and incorporating large woody debris for improved mesohabitat (Tetra Tech 2004).

The cumulative effects of the Proposed Action plus the described related projects may produce short-term changes in several aspects of the existing hydrology, hydraulics, and fluvial geomorphology throughout the Albuquerque Reach. The Proposed Action may affect other specific downstream restoration projects by changing local fluvial geomorphology and hydrology. Other projects listed here may affect the Proposed Action by altering physical processes upon which the proposed techniques depend. Changes in upstream water operations may augment and improve the effectiveness of proposed projects or may decrease their effectiveness.

While all the parties to these various actions recognize the need for dramatic change in the riverine ecosystem to provide better support for the endangered RGSM, the complex cumulative outcome of multiple actions will be unpredictable and potentially adverse to water quality and various indicators of RGSM reproductive success. The only effective means of dealing with the complex cumulative effects in ESA critical habitat will be to coordinate efforts among all parties to obtain sound scientific measurement of the baseline parameters most closely associated with RGSM success, then develop and implement a detailed RGSM monitoring protocol. Further development and approval of an adaptive management strategy so that it is in place early in the implementation phase of the Proposed Action in 2005 would facilitate a rapid response to potentially adverse indicators.

4.17 SUMMARY OF EFFECTS AND SITE SUITABILITY

Different techniques considered for restoration would have short-term effects on some environmental resources but long-term beneficial effects on biological resources, including RGSM and RGSM critical habitat. The four subreaches considered for the different alternative techniques were not equally suitable. The overall effects of the proposed restoration techniques are summarized in Table 4.2.

Much of the in-stream restoration activity would take place north of the Alameda Bridge and south of the southern boundary of the Pueblo of Sandia. Site assessments were completed to decide which vegetated islands in this subreach might be selected for modification and evaluation. Assessments were also completed to evaluate the potential for implementing other restoration techniques. Determination of proper treatments was based on multiple field visits involving numerous GPS data collection points and photographs. Proposed restoration techniques would include island, bar, and bank line modification. Access would use existing levee roads or other access points in the vicinity of Alameda Bridge. Proposed staging and access will be coordinated with COA Open Space Division and MRGCD.

Bar enhancement and ephemeral channels would be utilized within the I-40/Central subreach. Multiple site assessments were completed, including the collection of photographs and GPS data, to evaluate this reach. Work at this location would create essential habitat for the early life stages of fish on the attached river bar. Restoration techniques would include bar modification and ephemeral channels, along with others. Access would be through the levee roads. Proposed staging and access will be coordinated with COA Open Space Division and MRGCD.

Island modification and evaluation, ephemeral channels, and bank line modification techniques would be implemented at the South Diversion Channel (SDC) site. Multiple site assessments were completed between the SDC and Rio Bravo Boulevard, including GPS data collection and photographs. A number of different rehabilitation techniques would be implemented within this subreach. Access would be from west levee road or the SDC. Proposed staging and access will be coordinated with COA Open Space Division, MRGCD, and AMAFCA.

Table 4.2. Environmental Consequences of Proposed Restoration Techniques and No Action Alternative

Environmental Resources	Proposed Action	No Action
Geomorphology and Soils	Short-term adverse impact on channel and bank geomorphology; long-term beneficial effects on channel geomorphology	The No Action Alternative would continue the geomorphic trends that are unfavorable for RGSM egg retention, and larval and adult success
Hydrology and Hydraulics	Short-term minimal adverse impact on hydrology; long-term positive effect	No change in the amount or duration of flows in the Albuquerque Reach
Water Quality	Short-term effects within applicable water quality standards; no long-term adverse effects	No change in levels of constituents such as pH, dissolved oxygen, temperature, and turbidity
Cultural Resources and TCPs	No adverse effects on archaeological resources; avoidance of any TCPs identified during Tribal Consultation recommended	No change to cultural resources and traditional cultural properties
Vegetation and Wetlands	Limited short-term effects on vegetation including some wetlands, no adverse effect on dense woody vegetation>3m tall	Continued trends in vegetation such as increases in non-native species and woody vegetation on islands
Fish and Wildlife	Short-term adverse impacts; long-term positive effect on fish and wildlife abundance and diversity from habitat improvements	Continued adverse trends toward decreased fish and wildlife abundance and diversity
Threatened, Endangered and Special Status Species	May affect but not likely to adversely affect Rio Grande silvery minnow, Yellow-billed cuckoo, Southwestern willow flycatcher, and bald eagle	Continued adverse trend toward decreased habitat for RGSM
Socioeconomics	No adverse effects. The costs of implementing the Project are within the annual range of variability for federal and state expenditures for Bernalillo and Sandoval County	Socioeconomic impact of No Action may result from higher costs of implementing other RGSM habitat restoration projects in the Albuquerque Reach
Visual and Aesthetic Resources	Short-term negative impacts; long-term positive effect	No long-term or short-term changes in the visual and aesthetic experience
Air Quality and Noise	Short-term adverse impact from increased ambient noise levels	No change in air quality or noise
Net Water Depletions	No adverse effects anticipated, further evaluation required	No change in net water depletions
Environmental Justice	No adverse effect	No change in environmental justice
Indian Trust Assets	Consultation was conducted to identify any affected ITAs. None Identified.	No change in Indian Trust Assets

4.18 ENVIRONMENTAL COMMITMENTS

Clean Water Act compliance is required of all aspects of the Project, and since most work associated with the Proposed Action will be completed within aquatic areas regulated by this law, a 404 permit is required. A state water quality certification permit under Section 401 of the CWA is also required.

To the extent possible, schedule construction during dry or frozen soil conditions.

Storm water discharges under the Proposed Action will be limited to ground-disturbing activities outside the mean high water mark. All such activities will be evaluated for compliance with National Pollutant Discharge Elimination System (NPDES) guidance, an NPDES permit, or a Storm Water Pollution Prevention Plan. The 404 and 401 permitting processes would be completed prior to commencement of the Proposed Action.

To avoid direct impact to migratory birds protected by the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703, ET seq.), clearing of woody vegetation and construction would be scheduled between August 15 and April 15, outside of the normal breeding season for many avian species. Should vegetation removal and construction be implemented during the breeding season (April 15-August 15), pre-construction breeding bird surveys would be conducted and monitoring performed to assure avoidance of impact to migratory birds and associated avian species. Any positive preconstruction survey results or observation of affected species during construction would be coordinated with USFWS to discuss nesting area avoidance.

To avoid negative visual impacts at the I-40 to Central subreach, native vegetation would be planted after the removal of current vegetation during habitat restoration activities.

A Temporary Construction Noise Permit may be required by the Albuquerque Environmental Health Department prior to construction, as specified in the local Noise Ordinance, Article 9 Section 9-13.

Wetlands will be avoided in the location of staging areas and access routes to the construction areas.

Monitoring will be performed at each site to insure that project goals are met.

Cumulative impacts will be evaluated of adjacent habitat restoration projects as they come online, and adaptive management techniques will be utilized for elements of the project where appropriate.

Appropriate permits for the Rio Grande Bosque and river access and staging areas would be acquired prior to the commencement of the Proposed Action.

Endangered Species Act (ESA) compliance has been addressed by formal consultation with USFWS regarding potential impacts to threatened and endangered species. RGSM critical habitat encompasses the entire project area (FR 2003b) in the river channel. BMPs would be

enforced to minimize potential impacts to RGSM from direct construction impacts and erosional inputs into the river during periods of work.

To remain in compliance, all reasonable and prudent measures and associated terms and conditions listed in the Biological Opinion must be implemented.

Reclamation has coordinated with the State Historic Preservation Office for purposes of NHPA Section 106 compliance. The Project is committed to avoidance of any TCPs in the project area. Should evidence of possible scientific, prehistorical, historical, or archeological data be discovered during the course of this action, work shall cease at that location and the Area archaeologist shall be notified by phone immediately, with the location and nature of the findings. Care shall be exercised so as not to disturb or damage artifacts or fossils uncovered during operations, and the proponents shall provide such cooperation and assistance as may be necessary to preserve the findings for removal or other disposition by the Government.